News In Health
NIH... NIH... NIH... NIH... NIH... NIH... NIH... NIH... NIH...
National Institutes of Health · Department of Health and Human Services · newsinhealth.nih.gov
June 2006

Ignore the Pain?

Innovative Pain Management Ideas

Two people fall and suffer seemingly similar injuries. Six months later, one has completely recovered but the other still has debilitating pain. How can different people seem to experience pain so differently? Through carefully controlled experiments using advanced brain imaging techniques, researchers are discovering that people's brains can process the same pain signals from their bodies very differently. These insights are leading to surprising new strategies for controlling pain.

Advances in pain research were the focus of the first annual symposium of the NIH Pain Consortium. NIH created the consortium to enhance pain research and promote collaboration among pain researchers across the many NIH institutes and centers involved with pain research. Scientists at the inaugural symposium described their investigations into the genes involved in pain, how nerves transmit pain signals from the body to the brain, and new medications and other therapies under development.

Dr. Robert Coghill of Wake Forest University explained that there are significant differences in the way people experience pain. When people had the same level of heat applied to the backs of their legs, Coghill recounted, the intensity of pain they reported was "all over the place"—from someone who said it didn't hurt at all to someone who said the pain was so intense they almost withdrew from the study.

Coghill's team wanted to see whether these ratings represent a true difference in the way people experience pain or differences in how they explain what they feel. To answer this, they examined the brain activity of their subjects using an MRI (magnetic resonance imaging) machine while they applied different levels of heat. They found that those who reported feeling more pain had stronger and more frequent activation in a number of brain areas, particularly a region called the primary somatosensory cortex.

These people were all getting a generally similar input delivered to their brains, but once the signal got into their brains, it seemed to be processed differently in different people. To see if they could manipulate that processing, the researchers trained people to associate different levels of painful stimulus with different tones. They then tested the impact of expectation by signaling a moderately painful stimulus but then delivering an intensely painful one.

"When we look at their pain intensity ratings, they decrease significantly," Coghill said. "The bigger the expectation people had that the pain was going to go down, the more the pain in fact went down. Changes in expectation accounted for 88% of the variability in the pain people said they felt."

What's the possibility that the subjects were only telling researchers what they thought they wanted to hear? MRI showed that their brain activation matched what they were saying they felt.

"These people really were experiencing less pain than they would normally when they were correctly expecting the stimulus," Coghill said. Expectation has a widespread impact on how the brain processes pain.

"The final word is always look on the bright side of life," Dr. Coghill concluded. "Try to think positively. That can really change the way you experience pain."

Dr. M. Catherine Bushnell of McGill University said that researchers have known for years that people feel more pain when they're focusing on

continued on page 2

Inside News

Wise Choices
Help Your Doctor Treat Your Pain

Doctors can prescribe several different medications and treatments for pain relief. To help them figure out how best to help you manage your pain, be prepared to talk about the following (a family member or caregiver can help someone with a communication or thinking impairment):

- **Pain.** Describe the pain—when it started, how long it lasts and whether it's worse during certain times of the day or night.
- **Location.** Show exactly where the pain is on your body or on a drawing of a body.
- **Intensity or severity.** How bad is the pain?
- **Other factors.** What, if anything, increases or decreases the pain?
- **Personal response to pain.** Fear, confusion or hopelessness about the causes of pain can affect how you respond to and describe pain. Don't be shy talking about things that are bothering you. Let your doctor know what you're going through.
- **Goals for pain control.** How much pain are you willing to put up with?
- **Other signs of pain.** Family, friends and caregivers may note behaviors that signal pain, too.

Source: NIH, National Cancer Institute

continued from page 1

it than when they're paying attention to something else. The problem in manipulating attention, however, is that mood and emotions play such a large role. But maybe manipulating mood, she thought, can have an effect on pain.

Odors have a strong emotional impact on people. By finding an odor someone likes and one they don't, Bushnell's group found that you can manipulate their mood. They went on to show that odor-induced mood affects how people rate pain when researchers apply heat to their arms.

"We found that, in fact, if you correlate the rating of pain unpleasantness with all these different factors…," Bushnell said, "the only factor that predicts the ratings of pain unpleasantness is mood."

Brain-imaging experiments showed that odor had a widespread effect on pain processing that involved many areas of the brain. Like the people in Coghill's experiments, those in Bushnell's really were experiencing different levels of pain.

Dr. Christopher DeCharms of Omneuron wanted to see if people could learn how to manipulate their brain activity themselves to affect how much pain they feel. It's already known that stimulating certain brain regions electrically or with certain medications can have an impact on pain, DeCharms explained. "What if you can train the patient to cognitively modulate that same brain region without surgery or pharmacology?" he asked.

He and his colleagues developed a way, using an advanced MRI machine, to acquire brain activity data in real time and then feed that information back to the patient. The subjects had a device on their non-dominant hand to generate a painful heat stimulus. A scrolling line graph or a graphic of a fire going up and down showed them in real time the activity in a brain region called the anterior cingulate cortex, an area involved in pain perception and regulation.

The subjects successfully learned to manipulate activity not only in that region of the brain, DeCharms said, but also in other regions in the pain processing network as well.

"Through the course of training, they showed greater and greater control over their pain perception," DeCharms explained. "Control over brain and control over pain mirrored each other very closely."

The group next wanted to see if it was possible to use this approach on chronic pain. They performed a similar procedure in chronic pain patients from the Stanford Pain Management Center, except without applying any external pain.

The subjects reported a substantial decrease in their chronic pain after just one session. They said they felt like they had a greater sense of control over their pain and that they felt they'd learned what they needed to do to control it. While the experiment had only 8 subjects, DeCharms says he is planning to test the technique with larger groups.

However effective this particular method proves, one thing does seem indisputable: psychological factors like mood and attention can affect how much pain you feel. ■

NIH Pain Information: painconsortium.nih.gov/pain_index.html

NIH News in Health (ISSN 1556-3898)

National Institutes of Health
Office of Communications
& Public Liaison
Building 31, Room 5B38
Bethesda, MD 20892-2090

newsinhealth.nih.gov

Editor Harrison Wein, Ph.D.
weinh@od.nih.gov
Tel: 301-435-7489 Fax: 301-496-0019

Contributors
Marian Emr, Margaret Georgiann (illustrations), Arthur Stone and Harrison Wein.

Subscribe to get email updates when new issues are posted online by sending an email to listserv@list.nih.gov with the words "Subscribe NIHNewsInHealth-L" in the message body.

We can send a limited number of print copies free of charge within the United States for display in offices, libraries or clinics. Please contact us for more information. You can also download copies for printing at our web site.

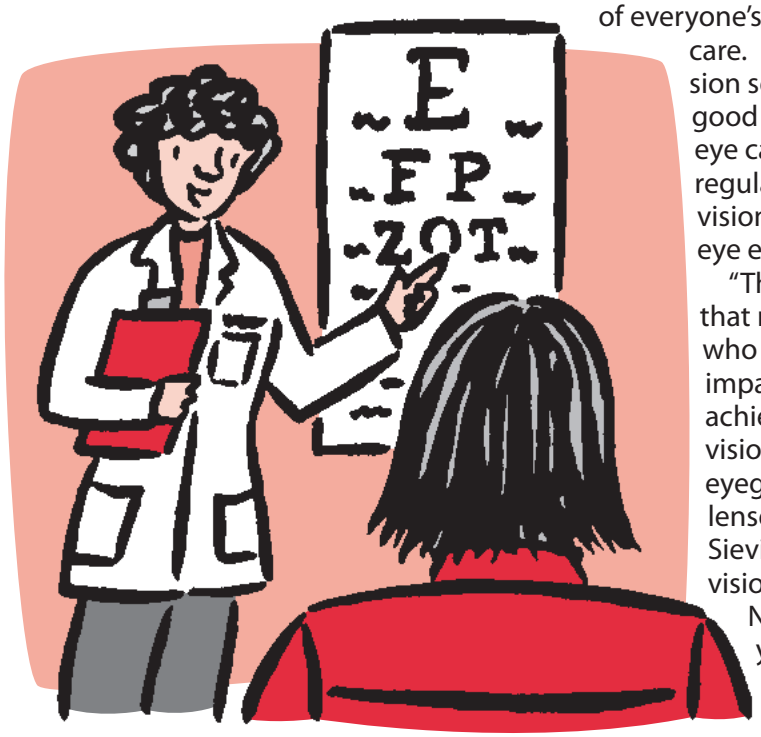
Good Vision

Millions Don't See as Well as They Could

Until now, there hasn't been a national survey on vision since the mid-1970s. A new report has found that although 94% of Americans 12 years old and older have good vision, the remaining 6%—14 million people—are **visually impaired**. Of these, more than 11 million could improve their vision with eyeglasses or contact lenses.

The new study, which was designed and supported by NIH's National Eye Institute, was part of the National Health and Nutrition Examination Survey, an ongoing survey by the National Center for Health Statistics of the Centers for Disease Control and Prevention. More than 15,000 people participated in the survey from 1999 to 2002. They were interviewed in their homes and invited to undergo a comprehensive health examination in a mobile examination center (MEC). More than 14,000 reported to a MEC, and more than 13,000 completed vision tests.

The study found that teenagers, people with diabetes, Hispanics and people who are economically disadvantaged have higher rates of visual impairment and can most benefit from corrective lenses. These findings will help policy planners and health care workers focus their efforts where they can do the most good.



Regular eye exams should be part of everyone's routine health care. Even if your vision seems fine, it's a good idea to see an eye care professional regularly for routine vision screenings and eye examinations.

"This study found that most people who have a visual impairment could achieve good vision with proper eyeglasses or contact lenses," Dr. Paul A. Sieving, director of vision research at NIH, said. "So, if you have trouble seeing, you should get your eyes examined as soon as possible. It may be that corrective lenses will improve your vision. But, if you do have an eye disease, the sooner it is found, the more likely it is that treatment can help preserve your vision." ■

Definitions

Visually Impaired
Has a problem seeing clearly.

www.nei.nih.gov/health

Statistics

People with visual impairment that can be corrected with glasses or contact lenses:

RACE/ETHNICITY

Hispanic: 88.2%

Black: 83.7%

White: 83.6%

Other: 88.6%

AGE (YEARS)

12-19: 93.1%

20-39: 90.0%

40-59: 92.4%

60+: 59.5%

Wise Choices

Check Your Vision

There are many signs that can signal vision loss. Even with your regular glasses, do you have difficulty...

- recognizing faces of friends and relatives?
- doing things that require you to see well up close, like reading, cooking, sewing or fixing things around the house?
- picking out and matching the color of your clothes?
- doing things at work or home because lights seem dimmer than they used to?
- reading street and bus signs or the names of stores?

Vision changes like these could be early warning signs of eye disease. If you answered "yes" to any of these questions, see an eye-care professional as soon as possible. The earlier your problem is diagnosed, the better your chance of keeping your remaining vision.

Health Capsules

Ability to Walk May Foretell Future

Exercise tests can be used to predict a person's risk of heart disease and mortality. But for certain older adults, traditional tests may be too rigorous. A new study shows that a simple extended walking test can be an effective method for older adults.

The researchers, supported by a grant from NIH, enrolled 3,075 people between 70 and 79 years old living in Pittsburgh, Pennsylvania, and Memphis, Tennessee. Some people were excluded from the test for medical safety. Those who participated were asked to walk a quarter of a mile in a hallway (10 laps). They were told, "Walk as quickly as you can, without running, at a pace you can maintain." They had a 2-minute warm-up, and were given encouragement at each lap. Of the 2,680 eligible for the test, 86% completed the full distance while 13% couldn't.

The researchers found that people who were excluded from the walking test or couldn't complete it had higher rates of mortality, heart disease and mobility limitations or disabilities about 5 years later. Among those able to complete the test, each minute longer it took them to finish was associated with a 29% higher rate of mortality, a 20% higher rate of heart disease and a 52% higher rate of mobility problems.

The study shows that, in apparently well-functioning older adults, a relatively simple test can expose a wide range of function and health risk. It highlights how important fitness is for older adults. Staying physically active into your 70s raises your chance of living a longer, healthier life into your 80s. ■

Exercise: A Guide from the National Institute on Aging:
www.nia.nih.gov/HealthInformation/Publications/ExerciseGuide

Getting Fit For Life:
www.niapublications.org/agepages/exercise.asp

Stroke: Know the Signs, Act in Time

Stroke is the nation's number 3 killer and the leading cause of long-term disability. More than 700,000 Americans will suffer a stroke this year.

In treating a stroke, every minute counts. New treatments are available that greatly reduce the damage caused by one. But you need to arrive at the hospital as soon as possible after symptoms start.

Many people don't know the symptoms of stroke or what to do when they see someone having one. Knowing the symptoms of a stroke and getting to the hospital quickly can help you act in time to save yourself—or someone you know—from serious long-term disability.

A stroke occurs when blood flow to the brain is interrupted. Brain cells die when they're deprived of the oxygen and nutrients provided by blood. Because stroke injures the brain, if you're having a stroke, you may not realize what's happening. But to a bystander, the signs of a stroke are distinct:

- Sudden numbness or weakness of the face, arm or leg (especially on one side of the body)
- Sudden confusion, trouble speaking or understanding speech
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness or loss of balance or coordination
- Sudden severe headache with no known cause

If you see someone with these symptoms, get help immediately.

Making changes in your lifestyle can help prevent stroke. Factors that increase your risk of having a stroke include high blood pressure, smoking, diabetes, physical inactivity and being overweight.

NIH's National Institute of Neurological Disorders and Stroke is dedicated to research and education about the causes, treatments and prevention of stroke. Talk to your doctor to find out your risks and take action now to prevent stroke. ■

www.ninds.nih.gov/stroke, or call 1–800–352–9424

Featured Web Site
NIH Research Matters

www.nih.gov/news/research_matters

Keep informed about research accomplishments by NIH and NIH-funded scientists. Brief, accessible stories describe research results and put them in perspective. The site also has instructions for how to subscribe to an RSS feed to get automatic updates whenever new stories are posted. *From NIH's Office of the Director.*